moderate and high anticholinergic activity respectively. Frequency of the use of drugs having anticholinergic activity prescribed along with cholinesterase inhibitors and NMDA receptor antagonist was compared using the Chi square test. **RESULTS:** Of the patients with AD, 654 patients were given cholinesterase inhibitors and NMDA receptor antagonist. Most of the AD patients were prescribed with cholinesterase inhibitors (86.69%) as compared to NMDA receptor antagonist (14.83%). 98.94% of patients on cholinesterase inhibitors and 93.82% on NMDA receptor antagonist were co-prescribed drugs with anticholinergic properties. Similar percent of patients on cholinesterase inhibitors and NMDA receptor antagonist were co-prescribed drugs with mild (65.43% vs 63.92%, p=0.7723), moderate (22.40% vs 21.65%, p=0.8699) and high (11.11% vs 8.25%, p=0.3990) anticholinergic activity. No statistical difference in prescribing moderate to high anticholinergic agents for treating Depression, Convulsions and Parkinson's disease was found in AD patients being treated with cholinesterase inhibitors and NMDA receptor antagonist. **CONCLUSIONS:** Patients with AD receiving cholinesterase inhibitors or NMDA receptor antagonist appear to be co-prescribed drugs having moderate and high level of anticholinergic activity without any distinction. Physicians should be more prudent in co-prescribing drugs with anticholinergic activity in patients with AD due to the high risk of adverse reactions.

PND2

AN EPIDEMOLOGIC EVALUATION OF COMORBID CONDITIONS IN PATIENTS WITH MULTIPLE SCLEROSIS

Livingston TP[1], Foulds P[2], Asselin R[2]
[1]*Biogen Idec, Las Vegas, NV, USA,* [2]*Biogen Idec, Wellesley, MA, USA*

OBJECTIVES: To study the prevalence of comorbid conditions in a population of patients with Multiple Sclerosis (MS). **METHODS:** In a retrospective analysis, integrated medical and pharmacy claims data (*IMS LifeLink™ Health Plan Claims and Longitudinal Prescriptions databases*) were analyzed to select patients with an active diagnosis of MS (ICD-9 code 340.*) during the 2009 calendar year. The presence of comorbidities was also determined using ICD-9 codes present on medical claims. Prescription drug use was evaluated by pharmacy claims and drug-specific billing codes. **RESULTS:** From the database, 18,013 patients with MS were identified. About two-thirds (67.6%) of patients were between 18 and 55 years of age, and 77.6% were female. Evidence of specific chronic conditions was substantial and included: hyperlipidemia (seen in 36.1% of patients), HTN (32.9%), diabetes (10.8%), asthma (8.3%), cardiac arrhythmias (7.2%), COPD (4.5%), and CHF (1.6%). The presence of any respiratory conditions (asthma or COPD) was present in 11.4% of patients, cardiovascular conditions (HTN, CHF, arrhythmias) in 37.3%, and metabolic conditions (DM, HTN, hyperlipidemia) in 50.5%. Though the prevalence of many conditions was age and gender dependent, their prevalence was independent of treatments including disease-modifying treatments (DMTs) such as interferon, glatiramer acetate, and natalizumab. **CONCLUSIONS:** This analysis illustrates the complexity of the case-mix of patients with MS. An increasing amount of evidence suggests that physical and mental comorbidities, and adverse health factors are common and can affect the disease. Because of the high prevalence of comorbidities, any treatment decisions should be carefully considered and should be individualized in order to optimize outcomes and reduce the potential interactions between treatment and comorbidities.

PND3

THE NATURE AND PREVALENCE OF COMORBID ILLNESS AMONG INDIVIDUALS WITH MULTIPLE SCLEROSIS

Stewart M[1], Phillips A[2], Edwards N[3], Gupta S[4], Goren A[5]
[1]*Pfizer, Inc., New London, CT, USA,* [2]*EMD Serono, Inc., Rockland, MA, USA,* [3]*Health Services Consulting Corporation, Boxborough, MA, USA,* [4]*Kantar Health, Princeton, NJ, USA,* [5]*Kantar Health, New York, NY, USA*

OBJECTIVES: Comorbidities in individuals with MS add to the complexity of disease management. A better understanding of the nature and prevalence of comorbid illness in MS may improve patient outcomes. The objective of this research was to gain a better understanding of the comorbid illnesses present in individuals with MS compared to individuals without MS. **METHODS:** The National Health and Wellness Survey (NHWS) is an Internet-based annual study of the healthcare attitudes and behaviors of a US representative adult sample. Demographics and comorbidities were compared between individuals with diagnosed MS and individuals without MS. **RESULTS:** Compared to subjects without MS, a greater proportion of subjects with MS reported being female (64.3% vs. 51.3%; p<0.001) and being white (non-hispanic) (78.7% vs. 74.0%; p=0.006). Subjects with MS reported more comorbidity compared to subjects without MS (Charlson Comorbidity Index: 0.97 vs. 0.82; p<0.001). Neurologic symptoms and conditions (pain 56.7% vs. 37.8%, headache 55.8% vs. 44.6%, migraine 29.5% vs. 16.4%, restless leg syndrome 18.7% vs. 7.8%, and stroke 5.2% vs. 1.4%; p<0.001), and psychiatric symptoms and conditions (sleep difficulties 43.3% vs. 29.6%, depression 39.7% vs. 23.5%, anxiety 33.0% vs. 22.6%, insomnia 28.5% vs. 17.8%, and panic disorder 8.2% vs. 3.6%; p<0.001) were more common in subjects with MS compared to those without MS. Rates for hypertension (33.6% vs. 32.8%; p=0.968) and high cholesterol (32.3% vs. 30.9%; p=0.669) were similar but cardiovascular conditions such as angina (4.8% vs. 2.9%; p<0.001), arrhythmia (4.8% vs. 2.7%; p=0.003), and peripheral arterial disease (3.7% vs. 1.4%; p<0.001) were higher for MS subjects. **CONCLUSIONS:** As expected, individuals with MS have significant comorbid illness compared to individuals without MS. Neurologic and psychiatric conditions and symptoms are common and typically more prevalent in MS. Cardiovascular risk factors are similar to individuals without MS but higher rates of cardiovascular conditions were observed.

PND4

DIAGNOSIS OF SHIFT WORK DISORDER AND THE IMPACT OF EXCESSIVE SLEEPINESS: RESULTS FROM SHIFT WORKERS, PATIENTS WITH SHIFT WORK DISORDER, AND HEALTH CARE PROFESSIONALS PARTICIPATING IN AN INTERNET SURVEY

Anderson C[1], Sylvester L[2], Paik S[2]
[1]*Cephalon, Inc., Frazer, PA, USA,* [2]*IPSOS, Norwalk, CT, USA*

OBJECTIVES: To understand how shift work disorder (SWD) affected the lives of shift workers (SWs) and how SWD was diagnosed from the perspective of health care professionals (HCPs) and SWs. **METHODS:** Two separate online surveys were administered to: (1) SWs with/out SWD and (2) HCPs. Participation in the SWs survey required ≥21 hours per week working shifts in the previous 2 weeks, a diagnosis of SWD or ≥10 score on the Epworth Sleepiness Scale (ESS), and ≥5 score on any of the subscales of the Sheehan Disability Scale (SDS). Participation in the HCP survey required ≥3 years in pre-designated specialties and at least 75% of their time spent in patient care. **RESULTS:** A total of 260 respondents complete the SWs survey and 673 the HCP survey. SW negatively impacted respondents' energy level, social life, and emotional and physical health. SWs also reported a loss of concentration (87%), mistakes (69%), and an injury (11%) at work. Many respondents used caffeine and 57% of diagnosed respondents received prescription medication to treat SWD symptoms. Of those SWs without diagnosed SWD, 23% denied having excessive sleepiness despite scoring ≥10 on the ESS and having functional impairment (SDS). For those SWs who consulted with their HCPs, SWs initiated this conversation more than HCPs (82% vs. 13%). HCPs believe that 67% of total SWD is never suspected by physicians and that 50% of SWD is undiagnosed because SWD is often masked by other conditions and/or misdiagnosed. **CONCLUSIONS:** Respondents reported that excessive sleepiness and insomnia associated with SW seriously impacted their lives at home and at work. SWs do not always recognize their SWD symptoms and are more likely to initiate a discussion of those symptoms than HCPs. HCPs believe that SWD is often missed as it is masked by other comorbidities or misdiagnosed.

PND5

ASSESSMENT OF PARKINSON'S DISEAES PROGRESSION RATES BY STAGE OF DISEASE

Johnson SJ[1], Kaltenboeck A[1], Diener M[1], Tarrants M[2], Birnbaum H[3]
[1]*Analysis Group, Inc., New York, NY, USA,* [2]*Teva Neuroscience, Kansas City, MO, USA,* [3]*Analysis Group, Inc., Boston, MA, USA*

OBJECTIVES: To assess Parkinson's Disease (PD) progression using the Hoehn and Yahr (H&Y) scale over the complete disease course based on systematic literature review with meta-analysis. No systematic review of PD studies using H&Y has been undertaken. Such findings could support models to evaluate economic effects of disease modifying therapies. **METHODS:** A systematic literature review (PubMed) was conducted to identify research since 1990 that reported longitudinal H&Y outcomes to obtain progression time data. Reference lists from retrieved articles were also reviewed and supplemented with recommendations from an expert neurologist. Statistical moments (e.g., survival at time t, median time to progress) were extracted and expected time to progress to the subsequent stage was calculated assuming a constant hazard rate of progression with a binomial distribution for progression rates. Average time to progress through all stages of disease was calculated. Random effects meta-analysis was performed to assess heterogeneity between studies between each stage in progression. **RESULTS:** Of 554 identified relevant titles, 56 articles were reviewed. Ten studies, including one open label extension (OLE) trial and nine cohort studies, reported longitudinal H&Y outcomes for 3,687 patients observed over an average of 13.5 years. Weighted by study sample sizes, expected time to progress from H&Y 1 to H&Y 5 was 162.1 months. The OLE trial had longest expected total progression time (431.8 months, N=110); other studies ranged from 102.0 to 171.7 months. Time from H&Y stage 1–stage 2, 2–3, 3–4, and 4–5 were 32.3, 60.5, 42.9 and 26.4 months, respectively. Meta-analysis indicated significant heterogeneity in progression time between studies (I^2>95%). Omitting single studies did not affect pooled estimates. **CONCLUSIONS:** Economic assessment of impacts of PD disease modification can consider expected progression rates over the full course of the disease. Progression rates are most rapid from H&Y stage 4 to 5.

PND6

THE IMPACT OF SPECIALTY CARE PROGRAMS ON RELAPSES OF MULTIPLE SCLEROSIS USING ADMINISTRATIVE DATA

Tang J[1], Levin MC[1], Bailey JE[1], Faris RJ[2], Hong SH[1], Chang CF[3], Wang J[1]
[1]*University of Tennessee Health Science Center, Memphis, TN, USA,* [2]*Accredo Health, Memphis, TN, USA,* [3]*The University of Memphis, Memphis, TN, USA*

OBJECTIVES: Relapse reduction is important for multiple sclerosis (MS) because relapses lead to faster deterioration of patient health status. This study aims to evaluate the impact of specialty care programs which mainly focus on mail-order, professional monitoring and assessment for MS patients nationwide, compared to usual care. **METHODS:** Administrative claims for people with MS were extracted from the databases from a pharmacy management company for this retrospective cohort study. Enrollees with continuous pharmacy benefit eligibility were followed for three years. Patients exposed to specialty care programs were classified as specialty care group. Relapses were considered to have occurred when patients used steroids or were hospitalized due to MS. The outcome measures included the risk, number of relapses, and time to relapse. Logistic, negative binomial, and Cox-proportional hazards regressions were performed to compare between groups. **RESULTS:** Study cohort consisted of 1731 eligible MS patients, of which 1427 received the specialty care. During the study period, 1634 relapses were identified with a mean annual relapse rate of 0.3 among specialty care group versus 0.4